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JOHN E. FLETCHER

AS ICE AND SNOW, THE WEST'S HIGH COUNTRY STORES WATER FOR NEXT SUMMER'S VALLEY CROPS

Though cold weather has yet to arrive in most of the country, this scene at Crater Lake National Park is not unusual for high altitudes at this date. Depth of snowfall on mountain ridges is measured to determine the spring runoff (Bulletin No. 3).

Bulletin No. 1, November 7, 1949

Swiss Study Atom on Icy Alpine Ridge

WHAT is probably Europe's highest research station is being manned by Swiss scientists on an icy, wind-swept ridge in the Bernese Alps (Berner Alpen).

Site of the project is Jungfraujoch, Switzerland, located some 45 miles southeast of Bern, the Swiss capital, in a world of perpetual snow. Literally carved out of rock and ice at a breath-taking elevation of 11,342 feet, the spot already boasts the dual distinction of having Europe's highest railroad station and tourist hotel. The name, freely translated, means "Maiden Ridge."

Swiss Skill Overcomes Nature's Obstacles

Actually, Jungfraujoch isn't a town at all but a remote tourist and research outpost perched among the clouds. Besides the hotel, the only buildings are an Alpine research institute and two observatories, one used for astronomy and the other now devoted to atomic studies. "Streets" are a network of underground passages.

Until 37 years ago the place existed only in the minds of a few imaginative Swiss engineers who matched their technical skill against one of nature's most forbidding regions to construct the Jungfrau Railway.

The road itself was completed in 1912 after 16 years of work. Its length is a mere six miles, but in that short distance it climbs more than 4,500 feet from its starting point at Kleine Scheidegg to the Berghaus Hotel at Jungfraujoch.

A rack-and-pinion railway, the line still ranks as one of the world's engineering wonders. Most of its route leads through dark tunnels blasted out of solid mountain rock. The trip up takes one hour and fifteen minutes, including time for three brief station stops at lower levels.

Another construction feat is the Berghaus Hotel, which juts out from a rocky ledge to overlook miles of Alpine landscape and apparently limitless snowfields. Its chief "neighbors"—one on each side—are two white-capped peaks, the Monch and the Jungfrau, both well over 13,000 feet high. Below is the Great Aletsch Glacier, Europe's largest, reaching down a mountain valley for some 15 miles.

Winter Population—Ten

Many tourists journey to Jungfraujoch simply to enjoy the exceptional Alpine panorama. A more hardy class of visitors, however, goes there to attempt the many difficult mountain climbs, or to ski on the glistening snowfields. A large ice palace hewed from the glacier accommodates ice-skating enthusiasts.

The Swiss atomic scientists should be able to do their work at Jungfraujoch in almost perfect seclusion at least part of the year, for fewer than ten people live there regularly during the winter months.

In the past, this aerie of science has offered "one of the most pene-

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U.S. FOREST SERVICE

LIKE DEER BEFORE THE WHITE MAN CAME, DOMESTIC CATTLE ROAM THE FORESTS OF THE WEST

The national forests provide grazing for cattle, horses, sheep, and goats. Herd owners pay Uncle Sam a fee for the privilege. Such domestic animals are counted along with people during the official census every ten years. Wildlife censuses, however, are conducted by numerous organizations at various times (Bulletin No. 5).

Bulletin No. 2, November 7, 1949

Nyasaland, Rhodesias Consider Federation

NYASALAND, familiar to few but stamp collectors, grows in importance as a source of tea, tobacco, and tung oil for Great Britain. It was party of the third part in meetings held early this year on the brink of Africa's mighty Victoria Falls. Northern Rhodesia and Southern Rhodesia were the other parties present to study further the merits of a ten-year-old plan for a Central African Federation.

A British protectorate since 1891, Indiana-size Nyasaland is a land of mountains, woods, and lake views. It stretches its narrow length for nearly 400 north-south miles along the western and southern shores of elongated Lake Nyasa, southernmost of Africa's "great lakes."

Transportation a Problem

Its larger and better known partners in the federation idea are the Rhodesias, African monuments to Cecil Rhodes. Northern Rhodesia, British Crown Colony somewhat larger than Texas, lies to Nyasaland's west. California-size Southern Rhodesia, south across the Zambezi River, is most advanced of the three and already has virtual dominion status (illustration, next page).

Together they share opportunities for developing exceptional mineral, forest, and agricultural resources. Together they face extreme difficulties of transportation to ocean ports due to rugged terrain and landlocked positions.

Although occupying only one-twelfth the area of the Rhodesias, Nyasaland's African population is considerably larger than either of its neighbors while its European population is far smaller. The protectorate has one European settler for each 1,000 of its 2,225,000 natives.

The Europeans have blazed the trail in developing plantations, which grow coffee, cotton, peanuts, and soya beans as well as tea and tobacco. Tung groves form a growing new industry, supplying the nut that yields a fast-drying oil for paints.

Principal Towns in Shire Highlands

Natives have been encouraged to become small landholders. For the most part, however, they are working tenants or ordinary laborers on European-owned estates. Many thousands migrate a few months each year to work in mines of Southern Rhodesia and the Union of South Africa.

Nyasaland's principal towns, Zomba (the capital), Blantyre, and Limbe are in the Shire Highlands, where the southern tip of the country projects into Mozambique (Portuguese East Africa). Since early in the 1920's this region has had an outlet by rail. The line extends southward from these centers and crosses the Zambezi to the Mozambique port of Beira, which Portugal recently redeemed from a British-controlled private company on the expiration of a 50-year lease.

Cost of building the railway, which connects Lake Nyasa traffic with the Indian Ocean port, put the protectorate heavily in debt. Future plans call for improved land routes across southern Tanganyika to the

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trating lessons of the success of international scientific co-operation," according to Dr. Otto Struve, eminent astronomer. After a visit in 1948 he reported that "astronomers, meteorologists, cosmic-ray specialists, geologists, and many others, from various countries, work together in peace and harmony" in this "melting pot" laboratory.

NOTE: The site of the Swiss atomic research station in the Berner Alpen may be located in the National Geographic Society's map of Germany and Its Approaches. Write the Society's headquarters, Washington 6, D. C., for a price list of maps.

For additional information, see "Swiss Cherish Their Ancient Liberties," in the *National Geographic Magazine* for April, 1941*; "Lake Geneva: Cradle of Conferences," December, 1937; and "August First in Gruyères," August, 1936. *(Issues marked with an asterisk are included in a special list of Magazines available to teachers in packets of ten for $1.00)*

See also, in the GEOGRAPHIC SCHOOL BULLETINS, May 2, 1949, "Lake Geneva Waters Sink to Near-Record Low."

MELVILLE BELL GROSVENOR

GRUYÈRES CHILDREN PLAY AROUND THE STONE WHEAT MEASURE OF A BYGONE DAY

Where all could see, wheat was poured into the carved basins of various sizes for measurement and sale. The village of Gruyères now is known for its cheese and for its full-costume celebration on August first, the Swiss Independence Day. That the Swiss propose to maintain their ancient freedom is evidenced by the new atomic research station on near-by Jungfraujoch.

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Bulletin No. 3, November 7, 1949

Snow Survey Helps West Outwit Drought

REPORTS of the first big snowfalls in the high country of the West are a reminder that mountain snow now is regarded not only as scenery but as a vital basic resource. Next spring the high drifts will melt to provide irrigation water for thousands of acres.

But how many thousands of acres? Should farmers plan big crops next year or will there be enough melting snow to water them? Interested in how the Department of Agriculture measures snowfall, the *National Geographic Magazine* sent Andrew H. Brown, staff writer, along on a 1949 survey trip.

Water Means Life and Wealth

R. A. Work, a senior irrigation engineer of the U. S. Soil Conservation Service, five other men, and Brown traveled along the white crest of the Oregon Cascades for 573 miles in two Sno-Cats—motorized snow sleds running on skis and caterpillar treads (illustration, next page). It was the first journey of its kind. The story is told in the November, 1949, issue of the *National Geographic Magazine*.

Quoting Work, Brown writes: "People in the West have come to realize that high-country snow pack must be measured, conserved and 'harvested' as carefully as soil, forests, food, and fuel."

"Outwit the drought!" is not only slogan but necessity in America's soil-rich but semiarid states from the Rockies west to the Coast Range. Water means life and wealth. Scores of state, federal, and private agencies collect data about mountain snow.

Snow-survey reports indicating coming water supply make crop failures unlikely and also save time, seed, labor, and money. When farmers can be forewarned of drought, Brown notes, they plant only such crops as will mature with low water supply. They prune and thin orchards, and move livestock out of water-short areas before they starve. They develop wells and storage ponds.

In years of plentiful water, on the other hand, farmers can bank extra cash from added acreage brought under cultivation. Surplus water means bonus crops. Water requirements for grain, fruit, or pasture for a given soil type can be precisely stated.

Forecasting Surveys Cost Penny an Acre

Power companies, too, depend on snow runoff. Destructive early summer floods on many western rivers are due largely to melting snows. The magnitude and time of each flood are, therefore, approximatley predictable on the basis of snow surveys.

Today almost a thousand snow courses at elevations from 2,000 to 12,000 feet are measured in twelve western states and British Columbia. Last year 941 snow surveyors, traveling 30,150 miles by ski, snowshoe, or mechanized vehicle, made 40,014 individual snow measurements. Such forecasting costs less than one cent for each acre of irrigated land.

Snow fell on 20 days of the 22-day range-crest trip which Brown

newly developed port of Mikindani, which will benefit northern Nyasaland and Northern Rhodesia.

Gold, asbestos (see Bulletin No. 4), coal, and chromium pace Southern Rhodesia's successful mineral economy. Copper, lead, zinc, and cobalt come from mines in Northern Rhodesia. Nyasaland has only prospects, but one huge deposit of bauxite (aluminum ore) is estimated at 60 million tons. The near-by Zambezi offers potential hydroelectric power to refine the ore.

A Central African Council, established in 1945, brings representatives of the three areas together twice annually. One of its chief projects is elimination of the tsetse fly. Freed of the scourge of this fly, the whole region could become a vast meat larder.

It has been suggested that Tanganyika, Kenya, and Uganda be included in the federation. Such a union would bear the name Capricorn Africa. These six units of the British Commonwealth stretch from north of the Equator nearly to the Tropic of Capricorn.

NOTE: The countries considering plans for a Central African Federation may be located on the Society's map of Africa.

For further information, see "Rhodesia, Hope and Hobby of Cecil Rhodes," in the *National Geographic Magazine* for September, 1944; "The British Commonwealth of Nations," April, 1943; and "Trans-Africa Safari," September, 1938*.

See also, in the GEOGRAPHIC SCHOOL BULLETINS, March 21, 1949, "British Plans Affect Varied Africa Holdings"; and "Portuguese Buy Beira, Portuguese Port," January 31, 1949.

A 14-DONKEY-POWER TEAM CARTS LUMBER PAST A LINE OF 30-HORSE-POWER AUTOMOBILES

Animal transportation rather than the automobile gave Bulawayo its broad streets. When the city —comparatively new for Africa—was laid out in 1894, wide thoroughfares were designed so that many-teamed carts could make U turns. Although automobiles now crowd the curb before the ultra-modern buildings, the donkey teams carry on as they have for more than half a century.

Bulletin No. 4, November 7, 1949

Canada Unearths New Asbestos Deposit

THE shade of Charlemagne, early owner of an unburnable tablecloth, may be hovering about a recently discovered asbestos deposit in Canada. Operations will start shortly to market this strange substance which twelve centuries ago enabled the Frankish king to avert a war.

It was during a conference with potential enemies that Charlemagne threw an asbestos tablecloth into the fire and withdrew it unscathed. The incident, according to legend, warded off invasion, since his opponents did not care to strike a blow against a man who could conjure up such magic power.

Demand Has Exceeded Supply

Today, asbestos is as commonplace as it is convenient. It is used in hundreds of ways in households and industrial plants, in heating and water systems.

Canada, whose latest mine discovery lies in the Larder Lake region of the Province of Ontario near the Quebec border, already supplies about three-fourths of the world asbestos market. The output of the new mine, however, will be welcome, according to spokesmen for the industry, since, for a number of years, the demand for the very useful material has exceeded the supply.

This fabulous mineral is both rock and fiber. Blasted, and quarried like stone, or mined like other minerals, asbestos can be spun into yarn like wool, silk, or cotton. When woven into various textiles, it defies fire. To some extent, also, it withstands chemical erosion.

Actually, asbestos is not the name of one distinct mineral. It is a commercial term applied to a group of minerals having a fibrous structure. These minerals differ from all other minerals, and vary among themselves in length, strength, and flexibility. Consequently, their uses are extremely varied.

Long-Fibered Type Makes Curtains

Much asbestos is mined in open pits by methods similar to those employed in quarrying stone. The material also may be brought up through deep shafts from winding underground tunnels. It is estimated that from fifteen to twenty tons of rock are required to produce one ton of the soft, fluffy fiber.

Asbestos with long fibers which render it suitable for spinning is used in theater curtains and scenery, automobile brake linings, mattresses, and clothing for firemen, to name only a few products. The type whose fibers are not adapted to spinning goes into such things as roofing, fireproof walls, pipes, non-burning paper, and insulation for heating pipes.

Mixed with cement under heavy pressure, asbestos is made into fireproof shingles, wallboard, and sheets for roofing. This composition also is invaluable for use in buildings housing industries whose processes develop corrosive fumes.

Although asbestos has a wide variety of uses, a century ago not a

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took last March and April. The six-man team he accompanied crossed the main divide of the Oregon Cascades fifteen times. One purpose was to determine whether mechanized vehicles of the Sno-Cat type can really streamline snow surveying.

The conclusion was that they can, but by running a series of snow courses into the mountains from points along parallel foothill roads rather than by following the "ridgepole" of the range.

NOTE: The area covered by the snow-survey trip in the Cascade Range in Oregon may be located on the Society's map of the Northwestern United States.

For additional information, see "Sno-Cats Mechanize Oregon Snow Survey," in the *National Geographic Magazine* for November, 1949; "Oregon Finds New Riches," December, 1946; "More Water for California's Great Central Valley," November, 1946*; and "Columbia (River) Turns on the Power," June, 1941.

JOHN E. FLETCHER

WITH THE LOOK OF PRAYING MANTISES, SNO-CATS REST IN THE CASCADES' WINTER WONDERLAND

Near Devils Pass, Oregon, far from any road, a snow-measuring crew stops beside Hell Creek to admire a group of islets that look like angel food. The Sno-Cat's front wheels drop to the ground for snowless travel.

Bulletin No. 5, November 7, 1949

Censuses Count Birds, Fish, Beasts, People

NEXT spring, some 150,000 census enumerators will answer a question: Are there more or fewer than 150,000,000 people in the United States? At farms and ranches they will record the farmer's count of his domestic birds and beasts (illustration, inside cover).

Before the nation's 17th decennial census is taken, however, other thousands of census takers will have counted wild beasts and birds. They will even have made some fish inventories in rivers, lakes, and on ocean coasts.

Fish and Wildlife Survey in January

Christmas week, for example, will bring the 50th annual bird census —a project started by naturalist Frank M. Chapman in 1899. Counts will be made all over the United States and Canada by more than 2,000 men, women, boys, and girls. Although the Christmas bird census is very far from complete, it provides important comparisons in areas covered year after year.

More thorough in coverage will be the task of trained observers who will in January for the fifteenth time take a waterfowl census for the United States Fish and Wildlife Service. Since 1947 this has been a nation-wide inventory.

Conservation officers, forest rangers, ornithologists, and sportsmen team to watch duck and geese flyways and wintering grounds at a time when the birds center in limited areas and are relatively stationary.

Aerial photographers provide pictures of the waterfowl massed on marshland lakes and bays. In California jet planes have been labeled a success in this work, getting their pictures before scary geese have a chance to get away.

The carefully estimated waterfowl total has shown a rather sharp and steady decline since the 1944 peak of 125,000,000 birds. A September, 1949, survey of Canadian breeding grounds, however, indicates a probable increase in the official January, 1950, count.

Big Game Increasing

Fish inventories are less developed. Accurate counts are made of those that ascend the fish ladders at Bonneville and other power and irrigation dams. In trout lakes, mild electric shock treatment has been used to drive the fish to the surface to aid a tally. The ocean-going research ship, *Albatross III*, based at Woods Hole, Massachusetts, is at work on a five-year census of the food fish of the Atlantic coast which may produce definitive data on where and how many is Mr. Cod.

Big-game animals are increasing, according to inventories of nation-wide scope compiled by the Fish and Wildlife Service since 1937. For fifteen kinds tabulated, the latest count completed (1947) totals seven and three-quarter millions compared to a million less in 1941. Surveys are made for the most part in winter when rangelands are bare.

Deer of various species roam wild in all 48 states. They constitute

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single mine produced it in commercial quantities. Few deposits were known, although the substance itself had been in use, in one way or another, long before Charlemagne's time. The ancient Greeks and Romans are known to have used it.

Italy made the first attempts to extract the mineral for commercial purposes about 1860. After extensive deposits were discovered in Quebec Province, the center of the industry shifted to Canada.

Other big producers now are Russia, with large deposits in the Urals; Southern Rhodesia (illustration, below); and the Union of South Africa. The United States, which produces only from three to six per cent of its requirements, often imports as much as 90 per cent of its annual supply from its neighbor, Canada.

NOTE: Larder Lake may be located on the Society's map of Canada, Alaska & Greenland.

W. ROBERT MOORE

ROCKS, NOT SHEEP, ARE THE SOURCE OF THESE WOOL-LIKE HEAPS

Asbestos, processed from rock, lies in fleecy piles on the ground at the Shabani mine in Southern Rhodesia. The chunk in the man's left hand is just as it was broken from the rock; the fluffy wad in his right hand has been separated from the rock and cleaned. Lumps of asbestos-bearing rock are crushed to separate the fibers of the unique material. Cleaned and carded by machinery such as is used to process wool and cotton, fibers are spun into yarn and woven into fireproof textiles.

nine-tenths of the big-game total. Having reached a low ebb about 1915, they have increased under controls so that conservation is no great problem. Wisconsin, Michigan, Minnesota, and Pennsylvania report more than three million white-tailed deer. These states hold deer population at good conservation levels by setting open seasons that result in approximate ten-per-cent kills by hunters.

Second most widely distributed big game is the black bear (illustration, below). Once native to all 48 states, it is still found in 34. Although its total in the 1947 census was only 131,900, with Maine and Washington leading, it has steadily increased through the decade of the Fish and Wildlife Service censuses.

Most localized on the big game list is the piglike collared peccary, or javelina, whose droves are reported to number about 100,000 along the Rio Grande.

Bison, or buffalo, now number close to 4,000 on fenced rangeland, largely in Montana and South Dakota. From an estimated fifty million at the time of the early settlers, they dwindled almost to extinction. Forerunner of all attempts at big-game censuses was naturalist W. T. Hornaday's careful survey showing a tally of only 541 bison in 1889.

R. H. COOK

A BLACK BEAR FAMILY CONSENTS TO POSE INFORMALLY IN ITS WESTERN FOREST HOME

The furry, flat-footed animals have gained a reputation as "clowns of the woods" because of such amusing tricks as begging humanlike for food in national parks, standing on their heads, rolling over and over. Even captives in zoos retain their sense of humor and showmanship. In its natural state the black bear usually is not dangerous unless it thinks its cubs are endangered or unless it is teased by food offerings. The adult usually weighs between 200 and 350 pounds. Though timid, he can run fast and climb trees. He is a comical honey-stealer but also a dangerous beast to arouse.